Strategic opening of a new Chinese Restaurant in Singapore

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1 Introduction

1.1 Background

Singapore is a sovereign city-state and island country in maritime Southeast Asia . Singapore has a highly developed market economy, based historically on extended entrepôt trade. Along with Hong Kong, South Korea, and Taiwan, Singapore is one of the original Four Asian Tigers, but has surpassed its peers in terms of GDP per capita. Between 1965 and 1995, growth rates averaged around 6 per cent per annum, transforming the living standards of the population

As of mid-2018, the estimated population of Singapore was 5,638,700 people, 3,471,900 (61.6%) of whom were citizens, while the remaining 2,166,800 (38.4%) were permanent residents (522,300) or international students/foreign workers/dependents (1,644,500). According to the country's most recent census in 2010, nearly 23% of Singaporean residents (i.e. citizens and permanent residents) were foreign born; if non-residents were counted, nearly 43% of the total population were foreign born. The same census also reports that about 74.1% of residents were of Chinese descent, 13.4% of Malay descent, 9.2% of Indian descent, and 3.3% of other (including Eurasian) descent.

Since data suggests that majority of the people in Singapore are of Chinese descent and Singapore has a very strong economy , It would make sense to open a Chinese Restaurant in Singapore .

1.2 Problem

The restaurant business is a tricky one and can depend on several factors besides the food quality . It becomes even more complex if the main cuisine of restaurant does not belong to the native country . It then becomes important to choose a location that :-

1. Targets as many customers as possible
2. Has a population base with adequate spending power
3. Has not too many competitors

The project aims at clustering similar locations in Singapore based on Chinese population density , Monthly income brackets of the people living in the area and competitor restaurants so that it can help provide information to best choose a location to open a Chinese Restaurant .

1.3 Interest:

This problem is mainly for a new entrepreneur who wants to start a Chinese Restaurant business in Singapore but can be extended to existing restaurant chains

2 Data Acquisition and Cleaning:

2.1 Data Sources

The data required for this problem :

a. Competitor data – Chinese restaurants already available in Singapore for each planning area – Combination of foursquare API + Planning area data of singapre as described in the following:
b. Singapore Planning areas / subzones location data:
    - https://en.wikipedia.org/wiki/Planning_Areas_of_Singapore
    - https://en.wikipedia.org/wiki/Postal_codes_in_Singapore
    - Latitude and Longitude data can be made by google searching the planning area name
c. Geographical distribution , ethnic distribution and average monthly income data for Singapore
    - https://www.singstat.gov.sg/find-data/search-by-theme/population/geographic-distribution/latest-data

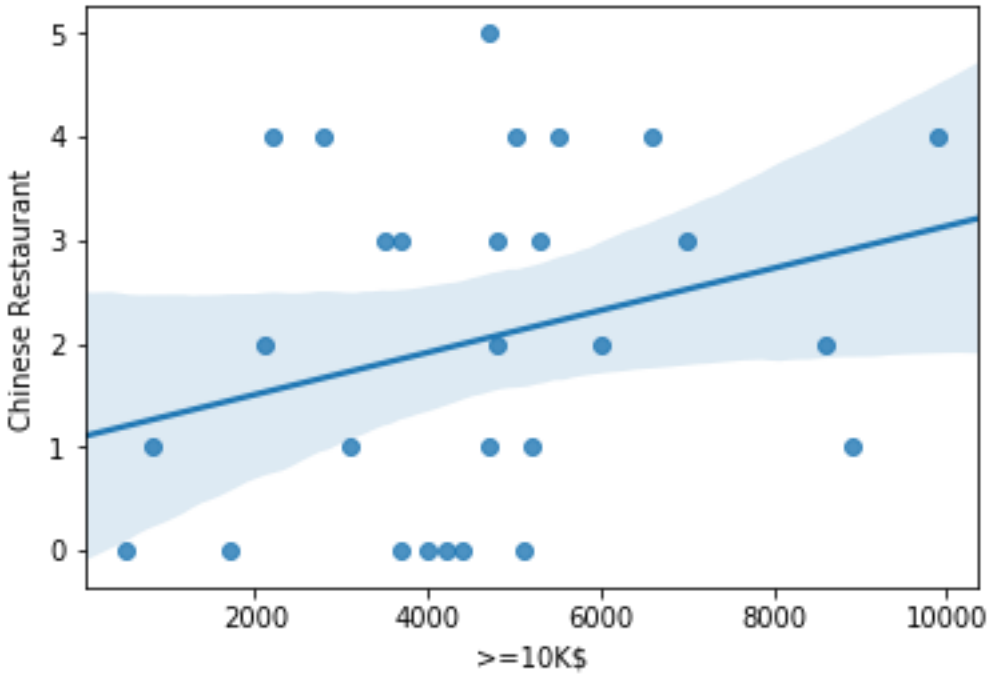
2.2 Data Cleaning

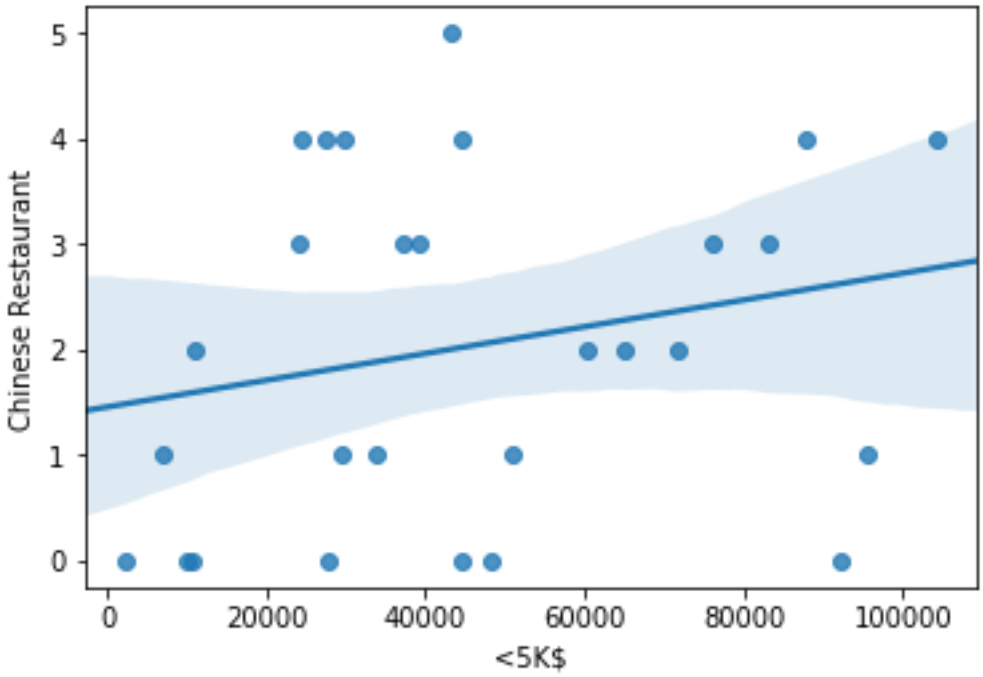
The above mentioned data sources for census , ethnic and planning areas , have been acquired and merged in independent excel files and read in the notebook . All the data has been cleaned and merged in the notebook . The analysis considers 28 Planning areas due to restrictions in data and time constraints . Missing values for population density has been replaced by the mean population density .

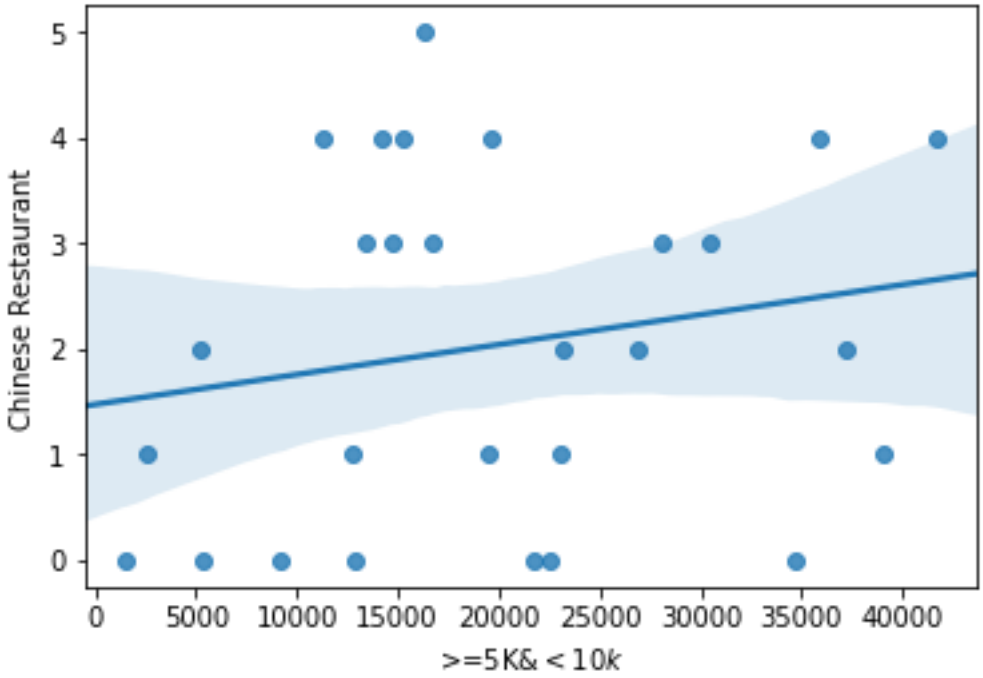
3 Methodology

The primary focus of the report is to enable the restaurant business owner to have a wholistic view where the target population lives , what are their monthly income brackets and what competition exists in those areas . Therefore key focus has been given on grouping the population in each planning area based on the monthly income data into 3 primary brackets - <5K$, >=5K$ and <10K$, >=10K$. Special focus has been given to Chinese population KPI , since the restaurant is primarily a Chinese restaurant . Hence the report calculates the number of Chinese restaurants already in the vicinity of each planning area and the Chinese population density that exists in those areas . The end desirable result is to cluster all the planning areas into 5 categories where in significance of these KPI's within each cluster helps a restaurant owner to decide the location to open his business .

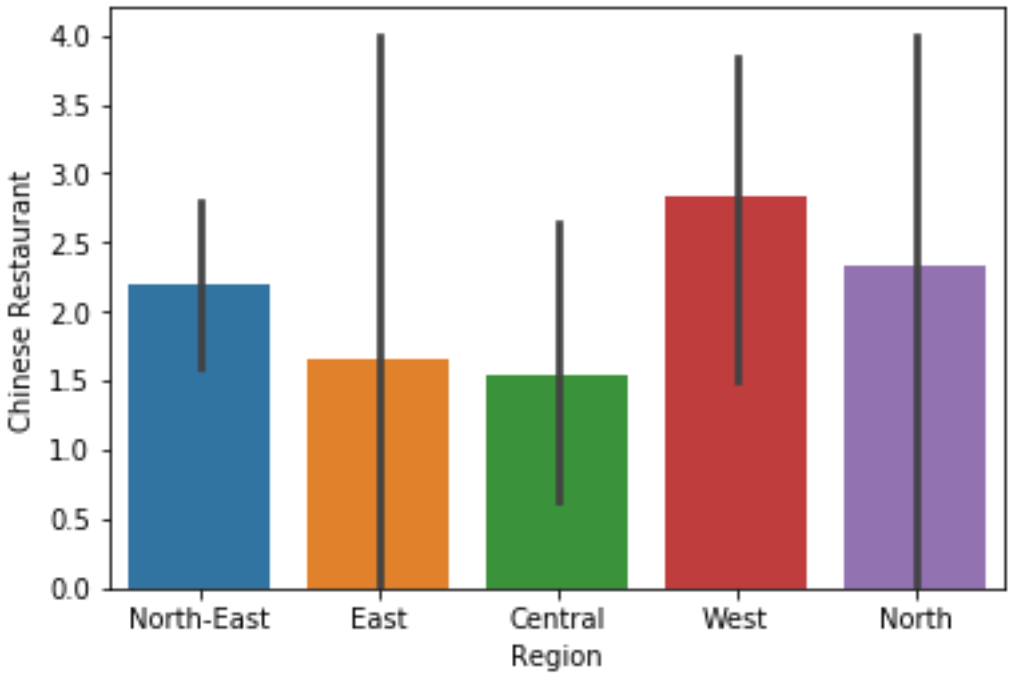
3.1 Relationship between Monthly income brackets and Chinese Restaurants

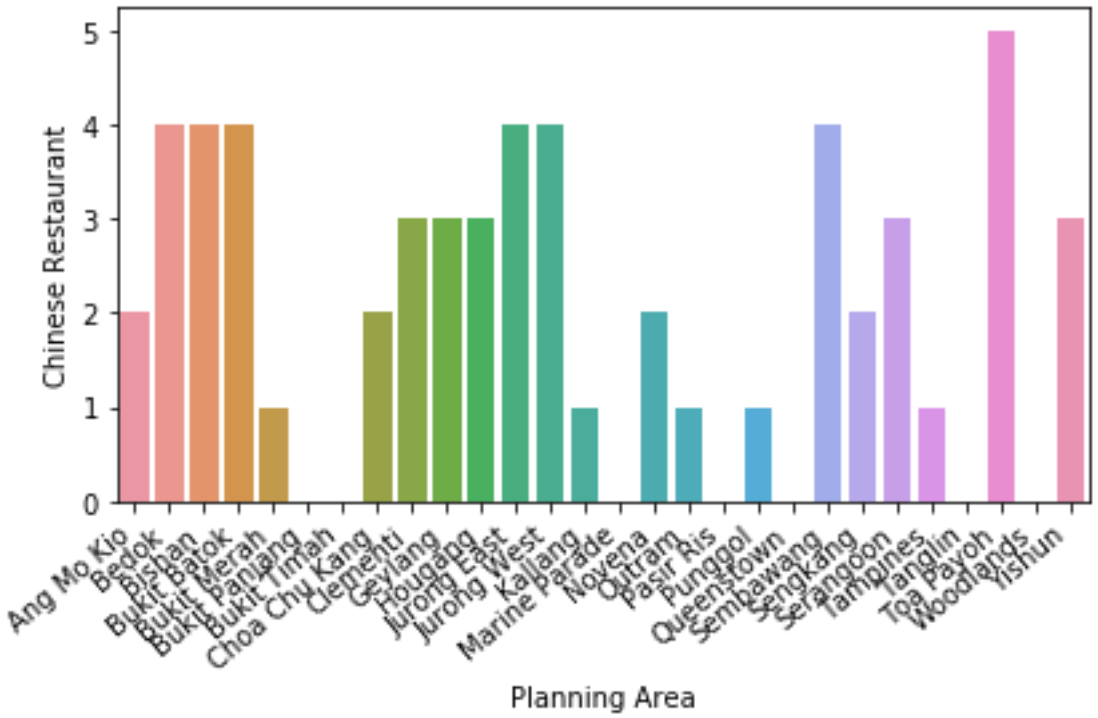




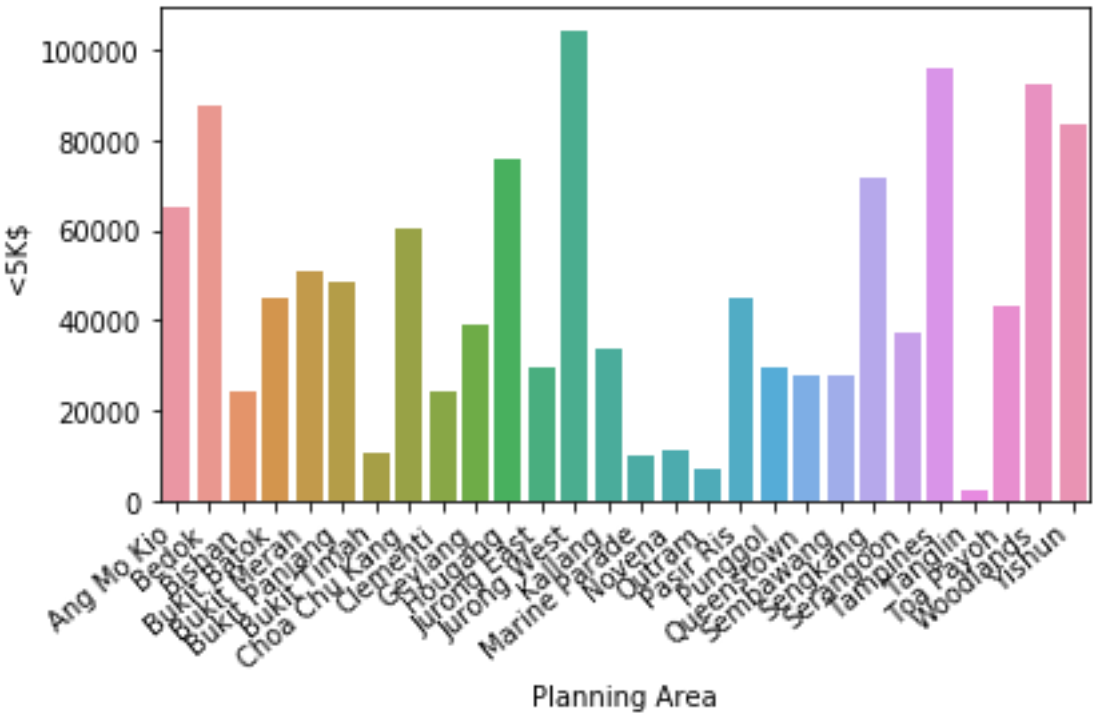


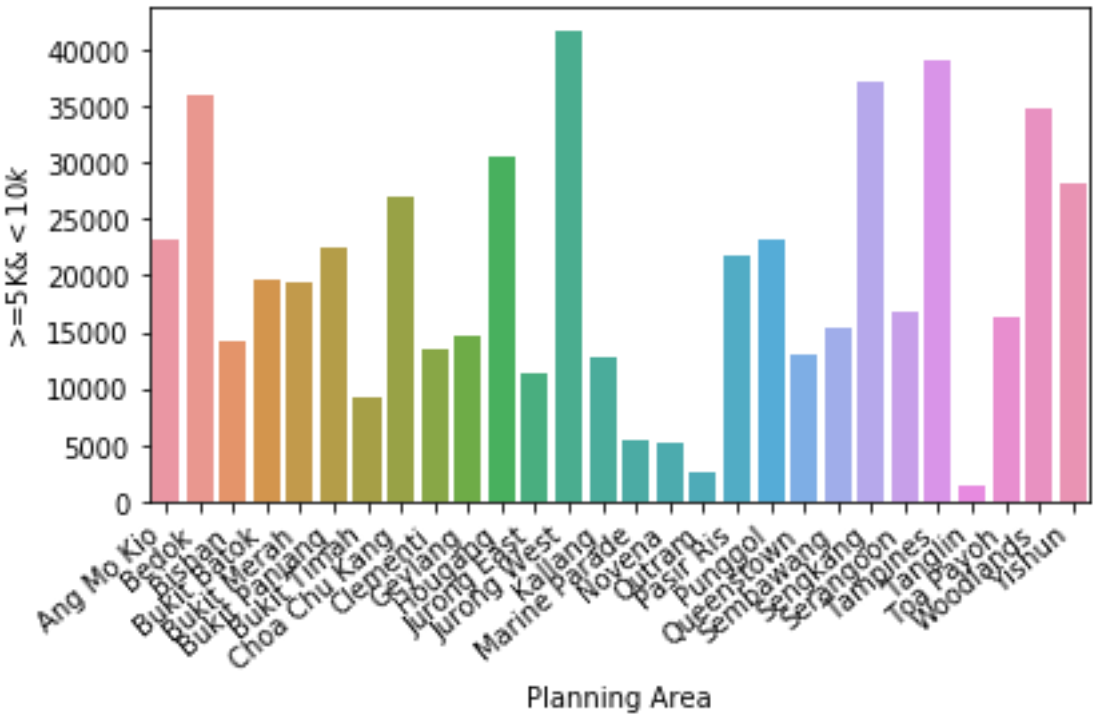
3.2 Relationship between Region, Planning Areas and Number of Chinese Restaurants





3.3 Population distribution by monthly income among planning areas




>=5K& < 10k
40000
35000
30000
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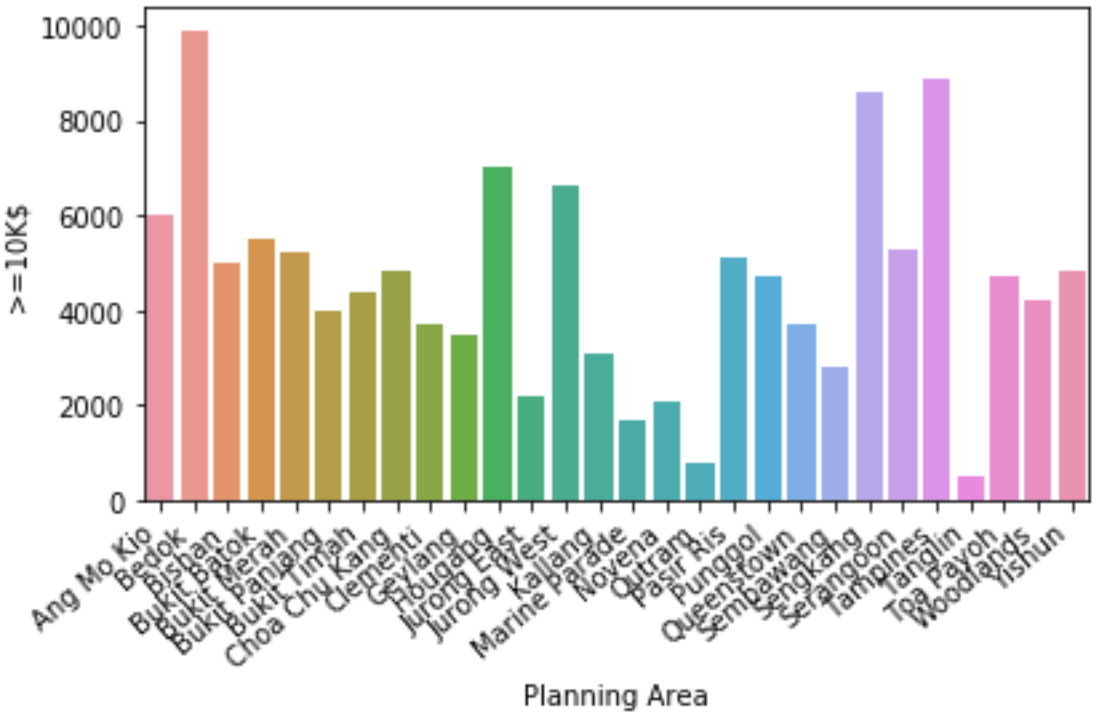
20000
15000
10000
5000
0
Ang Mo Kio
Bedok
Bishan
Bukit Batok
Bukit Merah
Bukit Panjang
Bukit Timah
Choa Chu Kang
Clementi
Geylang
Hougang
Jurong East
Jurong West
Kallang
Marine Parade
Novena
Outram
Pasir Ris
Punggol
Queenstown
Sembawang
Sengkang
Serangoon
Tampines
Tanglin
Toa Payoh
Woodlands
Yishun
Planning Area


>=10K$
10000
8000
6000
4000
2000
0
Ang Mo Kio
Bedok
Bishan
Bukit Batok
Bukit Merah
Bukit Panjang
Bukit Timah
Choa Chu Kang
Clementi
Geylang
Hougang
Jurong East
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Pasir Ris
Punggol
Queenstown
Sembawang
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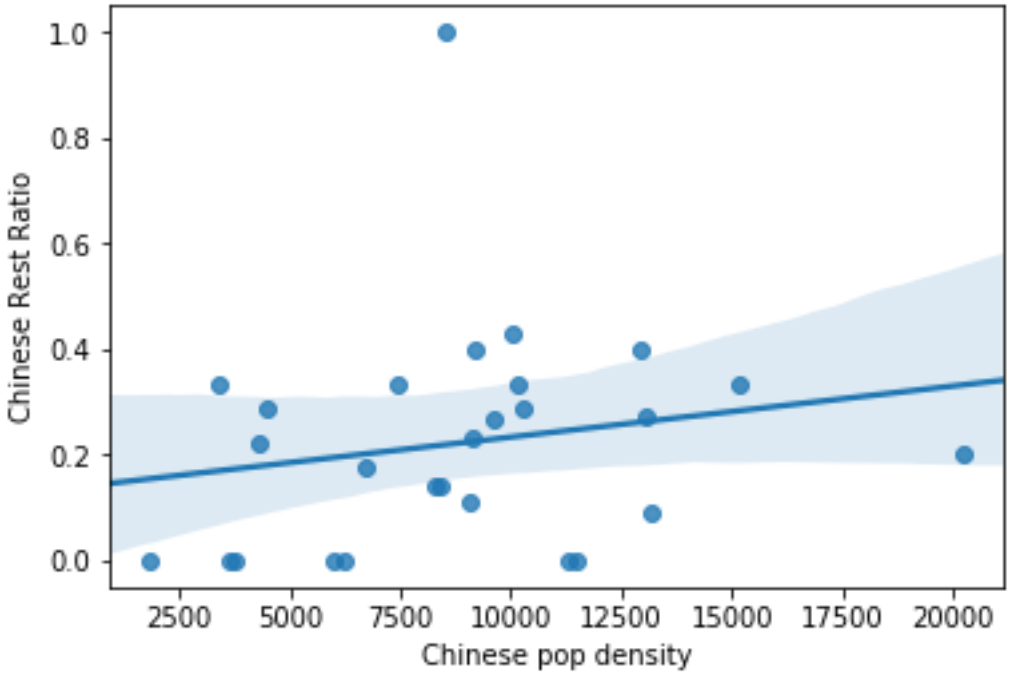
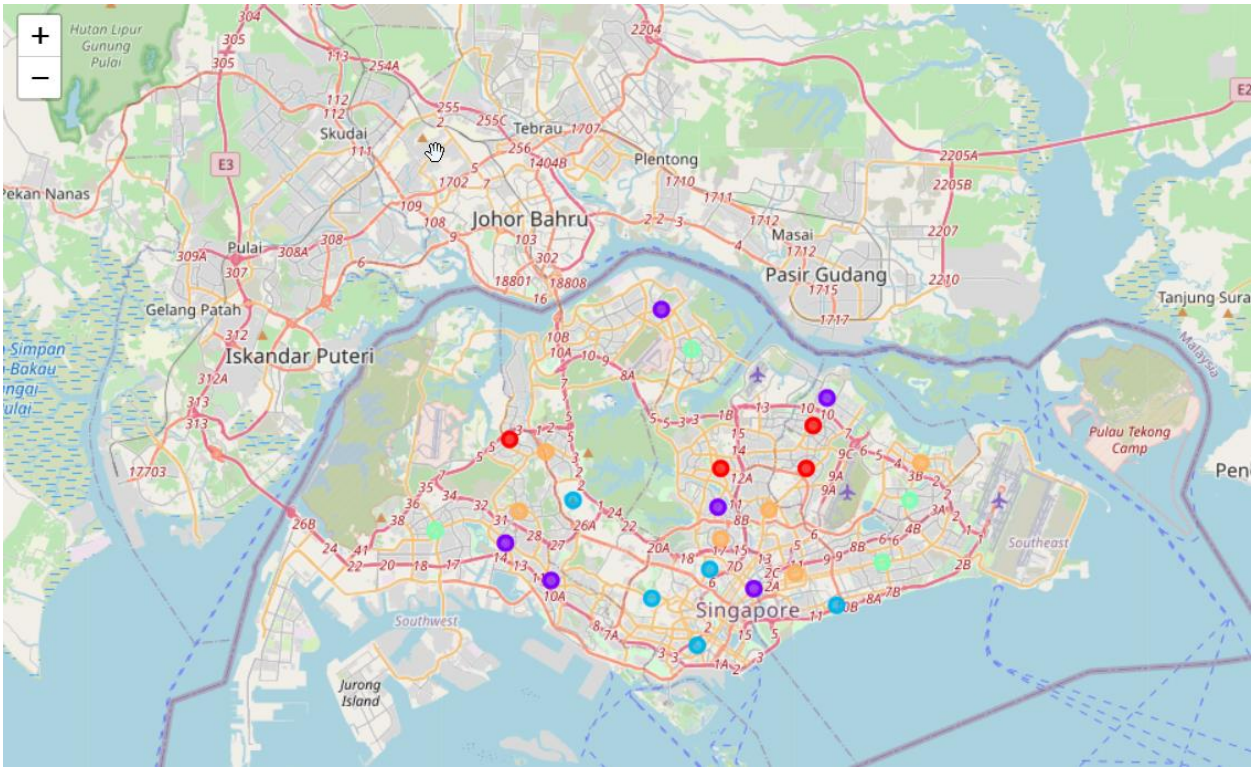
Serangoon
Tampines
Tanglin
Toa Payoh
Woodlands
Yishun
Planning Area

3.4 Impact of Chinese Population on Chinese Restaurant Ratio



3.5 Clustering

Above data analysis show that all the KPI's described in the data section have an impact on restaurant location. The report uses the K-means clustering algorithm to cluster and find similar regions based on the above KPIs – Chinese Population Density , Population with monthly income under 5K$, Population with monthly income >= 5K$ and <10K$, Population with monthly income >=10K$, Ratio of Chinese Restaurants present in planning Area .



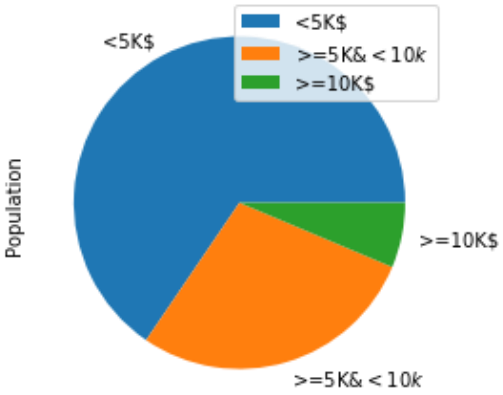
4 Results

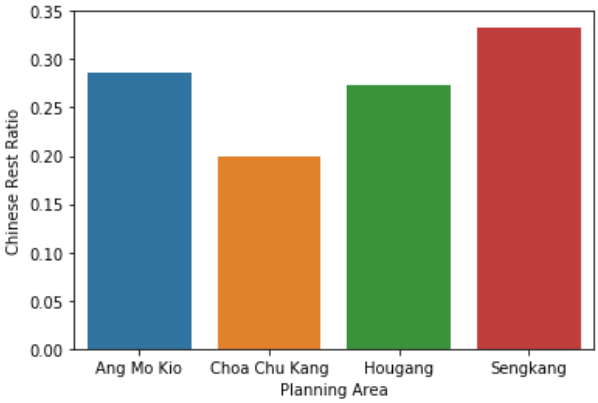
5 Clusters were found:-

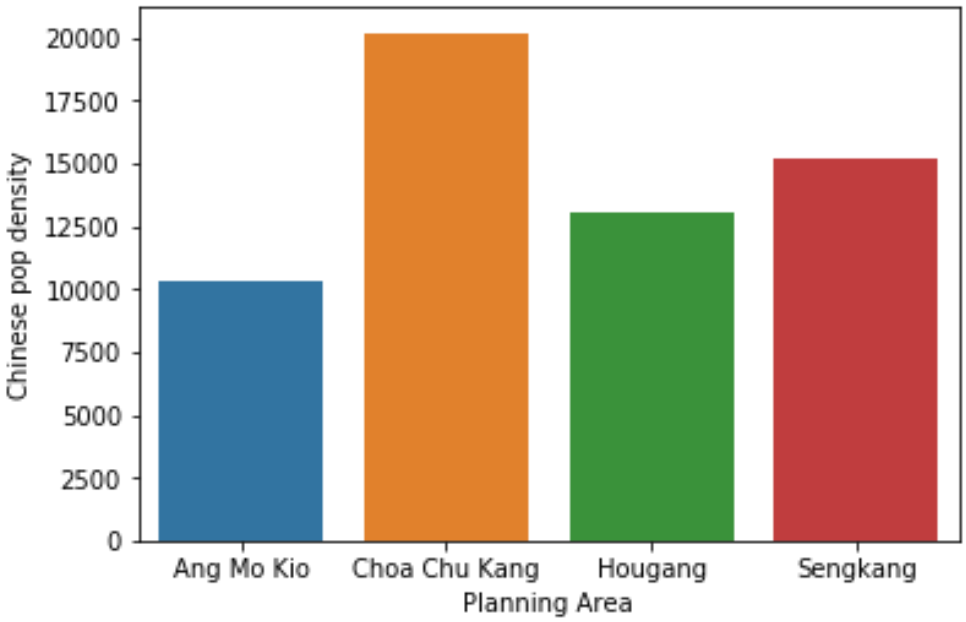
Cluster 1:

Properties

- Most of the population lives under 5K$ (Low income)
- 20-30% of the restaurants are Chinese (High Competition)
- 10-15K Chinese population density (per Km2) (High Population Density)



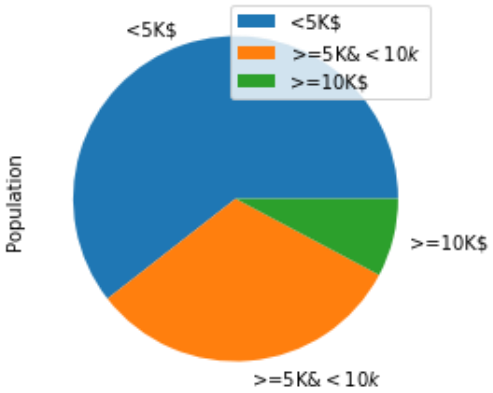


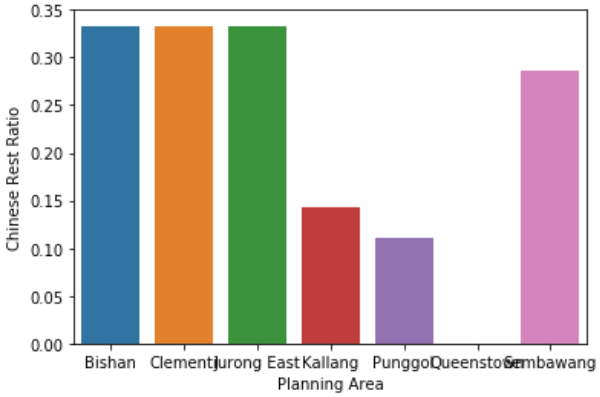


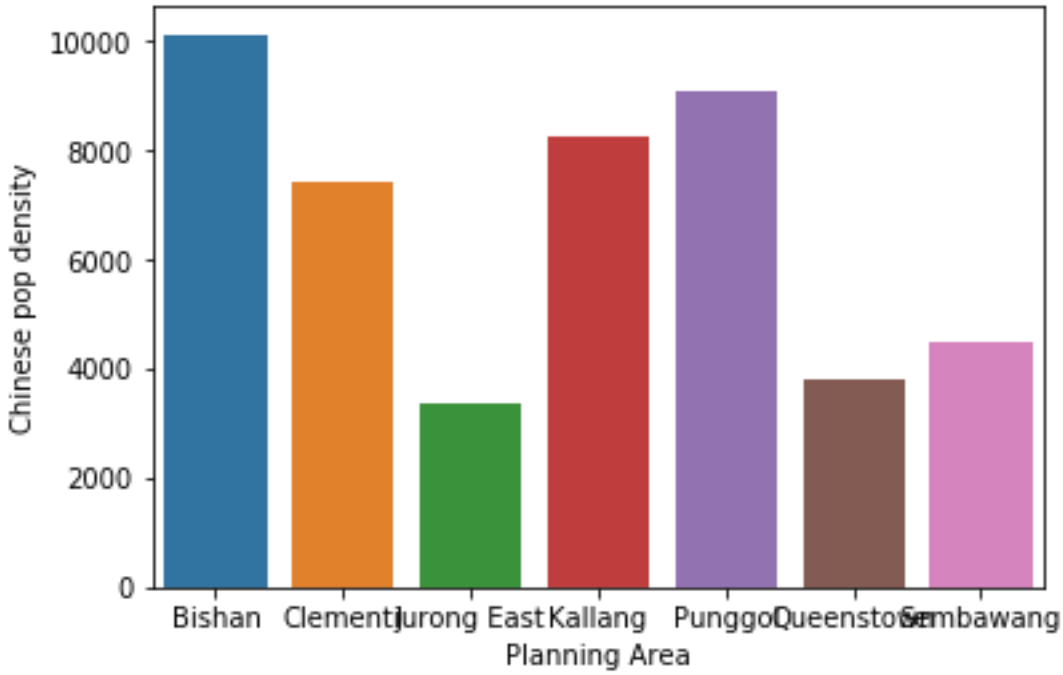
Cluster 2:

Properties:

- Significant people in income >=5K$ and >=10K$ (More than average income)
- Most areas have >=25% of Chinese restaurants (High Competition) . However **Queenstown** has no Chinese restaurant
- Average Chinese Population density is between 7K and 9K per Km2(Average Chinese pop density)



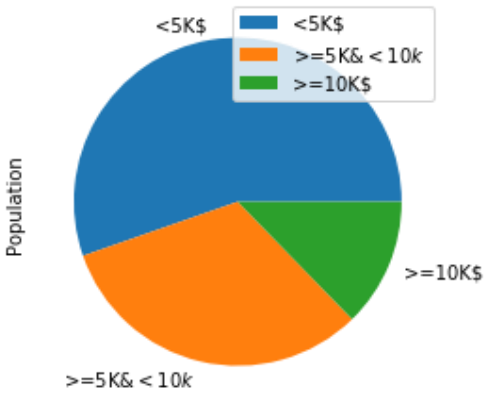


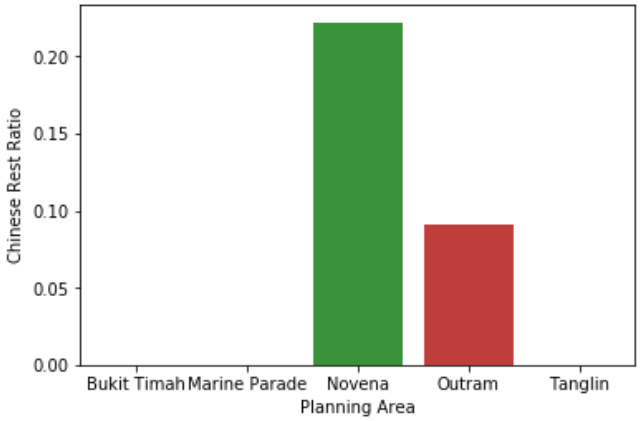


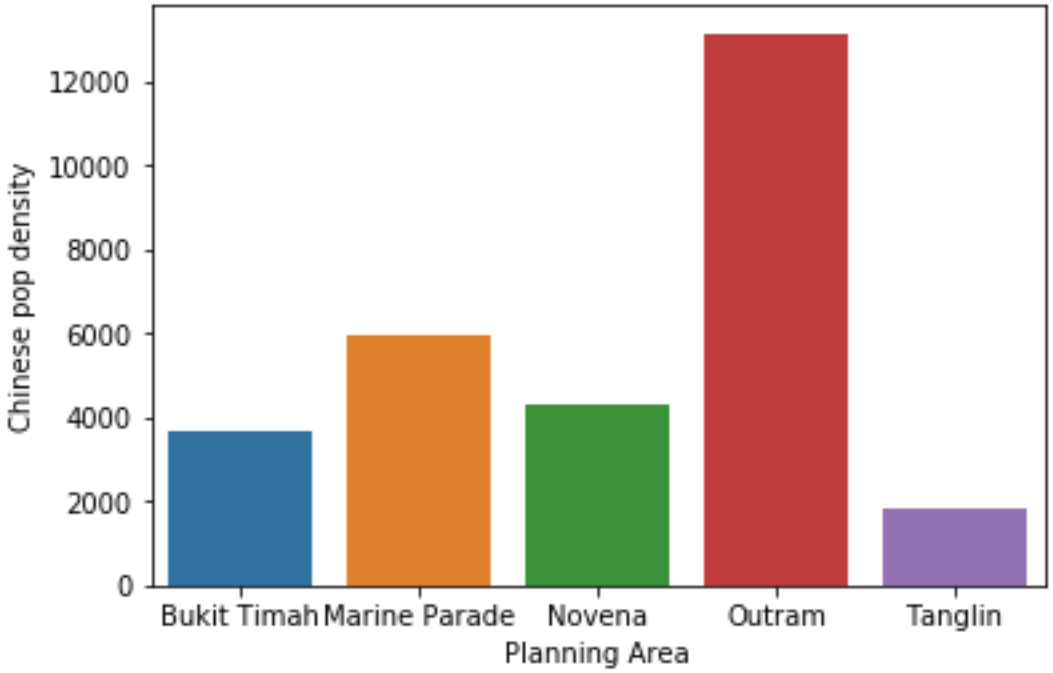
Cluster 3:

Properties:

- Significant people with income >=10K$ (High average income)
- Most areas have no Chinese restaurants (Low Chinese restaurant Ratio)
- Chinese Population density is pretty low (avg arnd 5K per Km2)
- However **Outram area** has high Chinese population density and around 9% Chinese Restaurants .



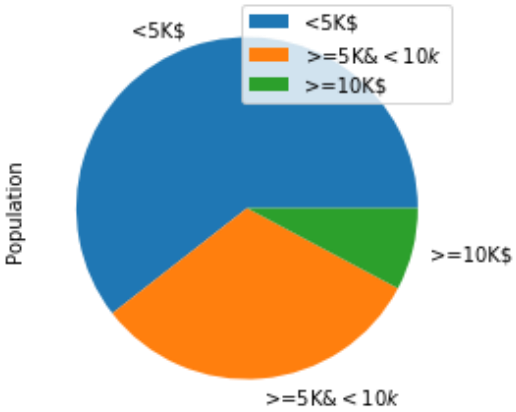


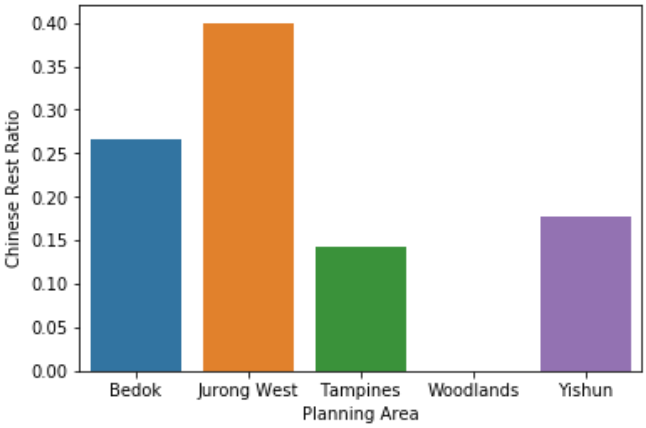


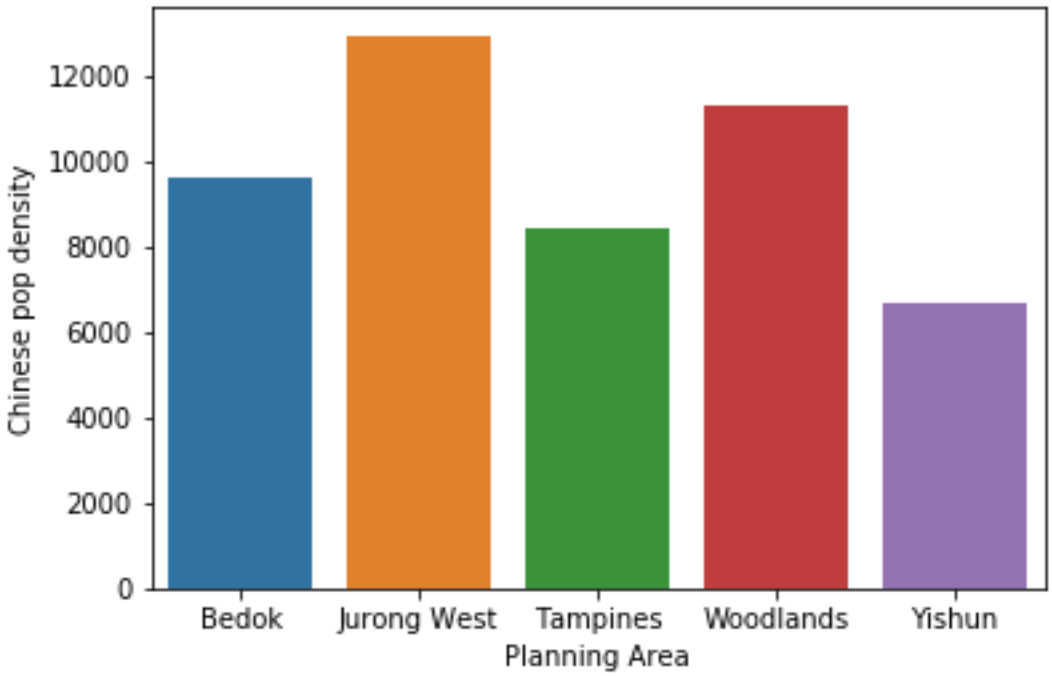
Cluster 4:

Properties:

- Significant Population in <5K$ and <10K $ (More than average income)
- 15% Chinese Restaurants on average (Moderate competition)
- Chinese population density on average arnd 10K per Km2 (More than average Chinese population density)
- Area **Woodlands** has no Chinese restaurant and pretty high Chinese population density(>10k)



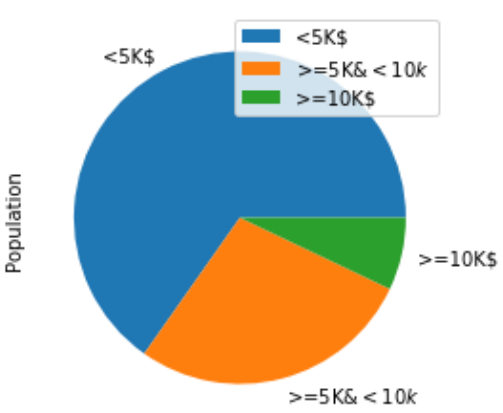


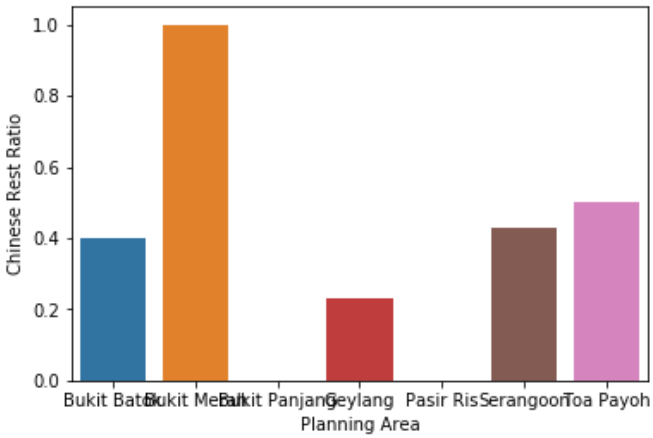


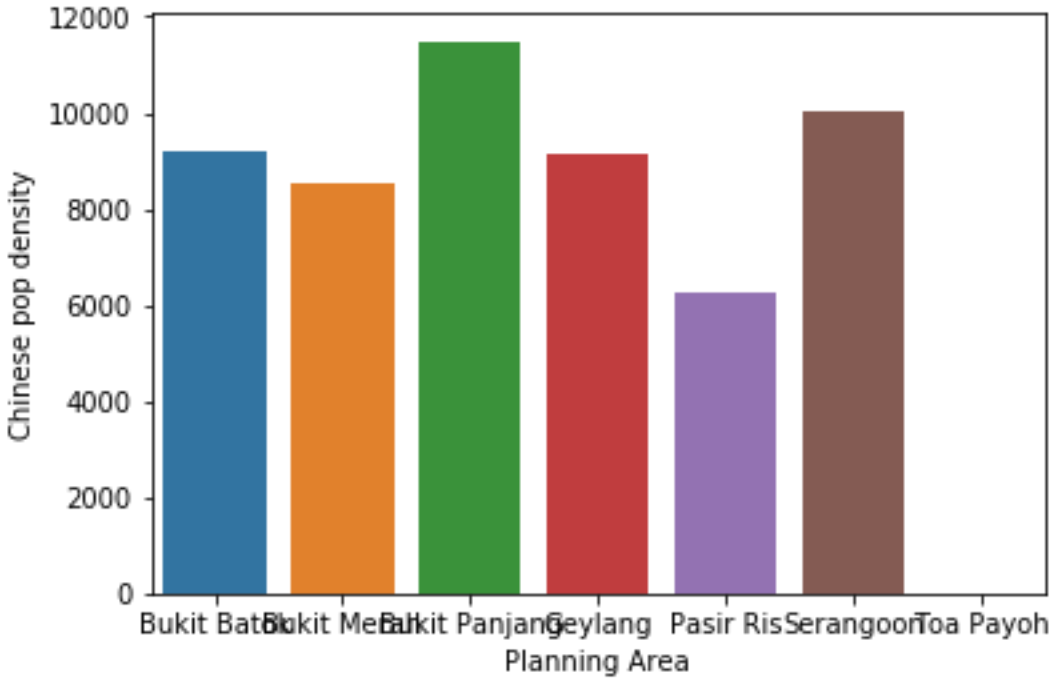
Cluster 5:

Properties:

- Most population under 5K$ (Low Average income)
- >30 % restaurants are Chinese (High Competition)
- Average Population Density (8-10K per Km2)







5 Discussions

- Areas in Cluster 1 have high Chinese population density and low average monthly income with high competition . This could be suitable for restaurants with under budget menus and not very expensive ones
- Areas in Cluster 2 have pretty high income and high competition , however Queenstown is an area where there is no Chinese Restaurant hence could be targeted
- Areas in Cluster 3 have very low Chinese Restaurant competition and more than avg income population . Outram is an area with high Chinese population density and could be suitable for the location

- Areas in Cluster 4 have more than average income and moderate competition . Woodlands is an area with no Chinese restaurant .
- Areas in cluster 5 have high competition , low average income and moderately high Chinese population density . It may not be suitable to open a restaurant here .

6 Conclusion

The above analysis was fairly able to identify areas based on the data where it would be optimal to open a Chinese Restaurant and where it would be not . The analysis however does not yet include the cost of living , cost of procurement and other factors that a restaurant has to deal with on a day to day basis due to time constraints . The solution however can be extended to include that analysis and can also be extended to existing Restaurant chains who want to open a restaurant at a new location . With the given data however the report successfully identifies the regions in Singapore where it would be suitable to open a Chinese Restaurant